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A NEW COTTID FISH, *NAUTICHTHYS ROBUSTUS*, FROM ALASKA AND BRITISH COLUMBIA

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Ottawa 1970

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Résumé

Le présent ouvrage décrit huit spécimens d'une nouvelle espèce de poisson, *Nautichthys robustus*. On l'a capturée à divers endroits, entre les îles de la Reine-Charlotte, en Colombie-Britannique, et l'île Attu, en Alaska. Elle est probablement sympatrique, dans une large mesure, de l'espèce jumelle très voisine *N. pribilovius* (Jordan et Gilbert), du golfe d'Alaska aux îles Aléoutiennes occidentales. *N. robustus* se distingue des autres espèces du genre *Nautichthys* par la présence d'épines céphaliques et de rayons dorsaux mous, ces derniers étant au nombre de 21 ou moins.

Summary

Eight specimens of *Nautichthys robustus*, a new species of fish, are described. The species has been collected at localities from the Queen Charlotte Islands, British Columbia, to Attu Island, Alaska. It is probably broadly sympatric with the closely related sibling *N. pribilovius* (Jordan and Gilbert) found from the Gulf of Alaska to the western Aleutian Islands. *N. robustus* differs from other species within the genus *Nautichthys* in possessing pointed head spines and 21 or fewer soft dorsal rays.

Introduction

During studies on the inshore marine fish fauna of the eastern North Pacific Ocean by staff of the Institute of Fisheries, University of British Columbia, several specimens of a previously undescribed form of *Nautichthys* were captured. This form, which is given the name *Nautichthys robustus* in this paper, is morphologically very similar to the previously described *N. pribilovius* (Jordan and Gilbert *in* Jordan and Evermann 1898). Several sibling species pairs, separated ecologically by their apparent differences in preference of water depth, are known from the eastern North Pacific Ocean (i.e., McPhail 1965; Peden 1966). It is probable that there are similar relationships between *N. robustus* and *N. pribilovius*. Since just eight specimens of *N. robustus* are known, an analysis of ecological relationships between these species can be made confidently only with the discovery of more *N. robustus* specimens.

Acknowledgment is made to the Fisheries Research Board of Canada at Nanaimo, which donated the *N. robustus* from the Queen Charlotte Islands to the Institute of Fisheries, and to the United States National Museum, which permitted the study of their specimens. Drs. D. E. McAllister and N. J. Wilimovsky reviewed the manuscript and made several valuable suggestions. Specimens of *N. robustus* were taken in the Aleutian Islands during expeditions supported by research grants given to Dr. Wilimovsky. The National Museums of Canada loaned comparative material for study.

Materials and Methods

Counts and measurements follow those of Hubbs and Lagler (1958). Collections deposited in the Institute of Fisheries are indicated by BC, those at the United States National Museum by USNM, and those at the National Museums of Canada by NMC.

The following collections of *N. robustus* were examined (numbers of specimens are indicated within parentheses; approximate latitude and longitude are indicated after certain localities). These include females and juveniles. Holotype: Attu Island, Alaska, 53° N and 173° E — USNM 204495 previously BC63-1004; paratypes: same as holotype BC63-886; Amchitka Island, 51° 20′ N and 179° 20′ E — BC63-1010(1); Bristol Bay, BC63-359(1); Queen Charlotte Islands, British Columbia, 54° 01′ 09″ N and 132° 35′ 12″ W — BC64-477(2); unknown locality — USNM 103649(2). These specimens range from 12 to 52 mm in standard length.

For comparative material the following collections of *N. pribilovius* were examined. These include representative samples of males and females. Wainwright, Alaska, 70° 45′ N and 160° W — BC63-1118(1); Point Marsh, BC63-1119(1), BC63-1120(1); Chukchi Sea, 67° 33.5′ N and 165° 02′ W — BC61-74(1); 67° 43′ N and 164° 44′ W — BC61-76(2); 68° 18′ N and 166° 55′ W — BC61-87(1); 68° 25′ N and 167° 12′ W — BC61-88(2); 68° 32′ N and 168° 52′ W — BC61-103(1); 69° 16′ N and 164° 22′ W — BC61-105(2); 69° 03′ N and 164° 52′ W — BC61-437(1); 68° 11′ N and 167° 12′ W — BC61-442(1); St. Lawrence Island, Bering Sea — USNM 14339(1), BC63-175(1); 64° 27′ N and 165° 40′ W — BC63-1203(1); Sea Lion Point, 57° 13′ N and 170° 04′ W — NMC 66-11; Norton Sound — USNM 14324(1), USNM 7343(1); 54° 19′ N and 169° 03′ E — USNM 10187(2); Bristol Bay, BC65-117(1), BC65-118(3), BC65-119(1); St. George Island, Pribilof Islands, 56° 40′ N and 169° 30′ W — USNM 48237 (holotype); Kiska Island, 52° N and 176° 40′ E — BC63-911(1); Semisopochnoi Island, 52° N and 179° 45′ E — USNM 70911(8); Adak Island, 51° 45′ N and 176° 30′ W — BC65-30(1), BC65-31(1); Region Island (near Woody Island), 57° 45′ N and 152° 30′ W — BC63-1026(1); 57° 42′ N and 155° 37′ W — USNM 3892(1); Staritschkof Island 52° 46′ 50″ N and 158° 44′ 30″ E — USNM 70992(2). These collections included individuals between at least 30 and 69 mm. Collections USNM 53654, USNM 53656, USNM 53657, USNM 48756, USNM 48755, and USNM 53655 were also examined. Several of the above records are indicated by Wilimovsky (1964); however this reference does not differentiate between the two forms of *Nautichthys* considered here.

NAUTICHTHYS ***ROBUSTUS***, sp. nov.

DIAGNOSIS –

A *Nautichthys* with pointed head spines and 19–21 soft dorsal rays.

HOLOTYPE –

A female, (fig. 1) 39.8 mm in standard length from Attu Island, Alaska, catalogued as USNM 204495: collected by N. J. Wilimovsky and A. E. Peden.

ETYMOLOGY –

Robustus refers to the more robust body shape in contrast to the more slender *N. Pribilovius*.

DESCRIPTION –

Counts and measurements are presented in Table 1.

Head stout, broad. Upper margin of orbit projects well above dorsal profile of head. Snout steep, short. In dorsal view, snout rounded and preopercle at widest point of body. Body robust, deepest under spinous dorsal fin. Nape very short. Enlarged base of spinous dorsal fin originates immediately behind level of occipital spines. Base of dorsal and anal fins long, straight. Anus and anal papilla near origin of anal fin. Gill membranes broadly fused to isthmus with no free fold. Teeth on palatines, prevomer, and both jaws.

Anterior nostril tubular, constricted distally, situated at antero-lateral base of nasal spines; posterior nostril medial to anterior margin of orbit. Orbit large. Interorbit deeply concave. Nasal spines sharp, strong, reaching to level of upper margin of pupil. Lower two preopercular spines reduced; upper two short and broad. Broad pointed postorbital pair of spines with small protuberances posterior to their bases. Two more pairs of broad pointed spines at posterior half of occiput. Ridges run between postorbital and occipital spines. Occiput deeply concave between these ridges. Smaller pointed spine in posttemporal region.

Large multifid cirrus on upper border of eye surface. Simple cirri present near tips of most of the head spines mentioned above (on all spines in the more northern specimens). Large pair of cirri on protuberance behind postorbital spines. Larger broad cirrus near posterior tip of maxilla. About six tubercle-like cirri on suborbital margin.

Scales present in form of small strong prickles enclosed in a fleshy papilla-like covering. Prickles cover most of body (sparse in axil of southern specimens and absent in axil of northwestern specimens). Prickles scattered over rays of dorsal, caudal, and upper portion of pectoral fins. Prickles scattered over head except on maxillae, premaxillae, lip of lower jaw, lower portion of suborbital stay and portion of gill membranes over the branchiostegal rays. Lateral line curves slightly upward in middle portion of body; lateral line elements with prominently projecting small spines at their posterior end.

Spinous dorsal fin short, separated from soft dorsal fin. Last spinous dorsal ray often barely projecting above skin. Anterior spinous rays tend to be higher. Soft dorsal fin of uniform height but rounded anteriorly and posteriorly. Origin of anal fin under about the sixth soft dorsal ray. Pectoral fin rounded, lower rays shorter. Pelvic fins reach to anus or origin of anal fin. Caudal fin: eight rays branched; rudimentary rays projecting; thin membrane incised between rudimentary rays.

Colour: In preservative, light brownish to a yellowish tan, lighter on ventral surface. Large black band directed vertically and slightly anteriorly across cheek to eye. Eye and orbital cirrus black. Dorsal fins tend to be

speckled or lightly dotted. Spinous dorsal fin darker. About four darker widely spaced bands often present on upper part of back; a few dark splotches often appear below them. Darker band across base of caudal fin. Mottled darker coloration on the distal half of caudal fin.

IDENTIFICATION

All eight specimens of *N. robustus* can be distinguished by the low fin ray counts. In particular they have 21 or fewer soft dorsal rays while *N. pribilovius* has 22 or more (Table 2). A difference of one fin ray with such a small sample size would normally be of little importance. However, all *N. robustus* also have pointed head spines (Fig. 2) while in excess of 40 *N. pribilovius* have rounded spines. Small and large individuals as well as both sexes of *N. pribilovius* which were examined conform to this pattern. Consequently the differences are not likely due to size or sexual phenomena. Previously, in *Nautichthys*, meristic differences have been attributed to sexual dimorphism (*see* Shmidt 1950), *N. pribilovius* being supposedly the female and *N. oculofasciatus* (Girard) the male. These species were accordingly synonymized; however Shmidt (1950) and Andriyashev (1954) have corrected this error and recognized the proper specific status of both forms. There is no reason to suggest a similar situation between *N. pribilovius* and *N. robustus*, especially since the specimens of *N. pribilovius* examined here include many individuals of both sexes.

Obviously when a larger number of individuals are examined, greater overlap in the fin ray counts can be expected. Thus a character index similar to that employed by Schultz and Welander (1934) for *Hemilepidotus* is given in Tables 3 and 4. Better separation of the forms is obtained when all the fin rays are added or when the lateral line counts are added to this cumulative fin ray count. Fishes with fewer median fin rays can often be expected to be more stout. However, the problems of allometric growth and possible sexual differences make the use of proportional measurements on this small sample size less reliable.

KEY TO THE SPECIES OF *NAUTICHTHYS*

A. Soft dorsal rays 27–30; anal fin rays 18–20; pectoral rays 13–14; lateral line pores 41–45:
. . . . . *Nautichthys oculofasciatus* (Girard)

AA. Soft dorsal rays 19–26; anal fin rays 14–20; pectoral rays 14–17; lateral line pores 35–42:

B. Rounded spines on occiput; soft dorsal rays 22–26; anal rays 15–20; pectoral rays 15–17; number of lateral line pores 37-42:
. . . . . *Nautichthys pribilovius* Jordan and Gilbert

BB. Pointed spines on occiput; soft dorsal rays 19–21; anal rays 14-15; pectoral rays 14-16; number of lateral line pores 35-38:
. . . . . *Nautichthys robustus*, sp. nov.

Distribution

Known collections suggest a large area of sympatry for *N. pribilovius* and *N. robustus* from at least Attu Island to the Gulf of Alaska. *N. pribilovius* is apparently more western and northern in distribution. Shmidt (1950) notes its presence in the Sea of Japan and Andriyashev records it northeast of St. Lawrence Island in the Bering Sea. Collections BC63-1118 from Wainwright, BC63-1119 and BC63-1120 from Point Marsh (approximately 90 miles west of Point Barrow, Alaska), and the collections listed from the Chukchi Sea greatly extend the northern known range from that previously recorded. Evermann and Goldsborough (1907) record *N. pribilovius* as far south as the vicinity of Kodiak, Alaska.

Four of the eight individuals of *N. robustus* were taken from the area geographically shared with *N. pribilovius*. This is between Attu Island and Bristol Bay. Collection BC64-477 was taken farther to the southeast at Naden Harbour Queen Charlotte Islands, by Dr. D. B. Quayle, of the Fisheries Research Board of Canada. It was obtained in a "Digby-type scallop dredge" in 78 to 102 ft. (29.8 to 31.1 m) of water on a sandy bottom on September 24, 1960. This is well outside the area of known sympatry and greatly extends the limit of the known range for the *N. pribilovius* and *N. robustus* species pair. It also provides the first record for a member of this species pair from British Columbia. Unfortunately, data for USNM 103649 were not available.

The limited data at hand suggest that in the area of sympatry *N. robustus* may inhabit shallower water. The Attu Island collections (BC63-886, USNM 204495) were taken near the lower limit of low tide (2 to 4 m depth of water) on rocky reef habitat that was exposed to wave surge. The specimen from Amchitka Island (BC63-1010) is extremely small (12 mm) and was attracted to an inshore surface light at night. Although occasionally found in shallower water *N. pribilovius* has been taken with trawls predominantly in deeper water. Gilbert and Burke (1912) record their collections from the Aleutian Islands as being from 258 to 336 ft. (79 to 102 m) depths and their Asiatic collections from 286 to 414 ft. (88 to 126 m) depths. In general, Shmidt (1950) and Andriyashev (1954) record *N. pribilovius* from 30 to 136 m depths. The majority of specimens of *N. pribilovius* recorded here are from deeper trawl catches. A major exception is the two Adak Island specimens (BC65-30, BC65-31), which were taken in a shallow bay (2–4 m) amongst kelp. Obviously further data from additional collections of the rarer species are needed.

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TABLE 1 — Counts and measurements in millimetres of known specimens of *Nautichthys robustus* sp. nov.

	BC63-359 #1	BC63-886 #1	USNM204495 #1	BC63-1010 #1	BC64-477 #1	BC64-477 #2	USNM103649 #1	USNM103649 #2
Counts:								
Pectoral rays (right–left fin)	15–15	15–15	14–14	14–14	15–15	15–15	15–15	15–16
Spinous dorsal rays	VIII	VII	VIII	VIII	VIII	VIII	VIII	VIII
Soft dorsal rays	21	20	19	20	20	21	21	20
Pelvic rays	I,3	I,3	I,3	I,3	I,3	I,3	–	–
Anal rays	15	14	15	14	14	15	15	14
Branched caudal rays	–	–	7	–	?	8	–	–
Lateral line pores	37	35	36	–	35	37	38	36
Measurements:								
Standard length	52.4	39.2	39.8	12.0	31.5	29.6	44.5	44.3
Head length	15.7	13.0	13.2	–	11.1	9.8	15.1	14.0
Eye diameter	5.3	3.8	4.3	–	3.6	3.4	5.1	4.7
Interorbital width	2.2	1.7	1.9	–	1.7	1.5	–	–
Snout length	4.4	4.0	3.6	–	2.7	3.0	–	–
Body depth	13.2	11.2	11.7	–	8.2	8.0	12.0	10.7
Body width	14.2	9.5	8.7	–	5.5	5.3	8.3	8.9
Predorsal distance	17.3	12.8	12.7	–	10.0	9.2	–	–
Preanal distance	30.2	23.1	23.4	–	17.8	16.9	–	–
Length of dorsal fin base	34.9	24.4	25.1	–	19.5	18.1	–	–
Length of anal fin base	18.5	13.1	13.9	–	10.5	10.6	–	–
Spinous dorsal height	6.3	4.6	4.1	–	4.8	3.8	–	–
Soft dorsal height	7.5	5.6	5.2	–	4.2	4.0	–	–
Anal fin height	7.0	4.1	4.8	–	3.8	4.0	–	–
Pectoral fin length	17.5	12.4	13.6	–	10.9	9.1	–	–
Pelvic fin height	10.9	8.0	7.7	–	6.5	6.5	–	–
Caudal fin length	11.9	9.0	8.2	–	7.2	7.0	–	–
Caudal peduncle depth	3.5	3.0	2.9	–	2.8	2.4	–	–
Caudal peduncle length	5.3	3.9	4.0	–	3.7	3.6	–	–

TABLE 2—Geographic variation in counts of *Nautichthys robustus* sp. nov. and *Nautichthys pribilovius*

	Number of pectoral rays (both fins)				Number of dorsal fin spines				Number of soft dorsal fin rays								Number of anal fin rays							Number of lateral line pores in standard length							
	14	15	16	17	7	8	9	10	19	20	21	22	23	24	25	26	14	15	16	17	18	19	20	35	36	37	38	39	40	41	42
Nautichthys robustus, sp. nov.																															
Bristol Bay																															
BC 63-359		2				1					1							1								1					
Attu Island																															
BC 63-886; USNM 204495	2	2			1	1			1	1							1	1						1	1						
Amchitka Island																															
BC 63-1010	2					1				1							1										?				
Queen Charlotte Islands																															
BC 64-477		4				2				1	1						1	1						1		1					
Unknown locality																															
USNM 103649		3	1			2				1	1						1	1							1		1				
Nautichthys pribilovius																															
Chukchi Sea		11	14	3		2	12					4	10					1	5	8						2	3	4	5		
Pribilof Islands (holotype)		2					1					1						1											1		
North and East Bering Sea		2	14			6	1	1				1	4	3				1	2	4	1						1	2	5		
Staritschkov Island		2	2			2							1		1				1		1								1	1	
Gulf of Alaska		4				2						1	1							2							1				
Kiska Island		2					1						1						?								?				
Semisopochnoi Island		?				?							4	3	1					?							?				
Adak Island		4				1	1						2							2							1	1			
Aleutian Islands and Kamchatka (Gilbert and Burke, 1912)		*	*			*	*						*	*	*	*				*	*	*									
Bristol Bay (5 specimens—Jordan and Evermann, 1898)		*	*			*	*						*	*					*	*											
Andriyashev (1954)		*	*	*	*	*	*					*	*	*	*	*		*	*	*	*	*				*	*	*	*		*
Sea of Okhotsk (Shmidt, 1950)		*	*	*		*	*						*	*	*			*	*	*	*	*				*	*	*	*	*	
Soldatov and Lindberg (1930)		*	*	*		*	*						*	*	*					*	*	*	*				*	*	*	*	*

TABLE 3—Character index based on total of anal, spinous and soft dorsal, and both pectoral fin counts

	Character Index													
	70	71	72	73	74	75	76	77	78	79	80	81	82	83
Nautichthys robustus, sp. nov.	2	1	1	1	3									
Nautichthys pribilovius							1	3	6	8	7	9	3	1

TABLE 4—Character index based on total of anal fin, spinous and soft dorsal fins, both pectoral fins, and lateral line counts

	Character Index																	
	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123
Nautichthys robustus, sp. nov.	2	1		1		2	1											
Nautichthys pribilovius									1		1	1	7	6	6	5	3	1

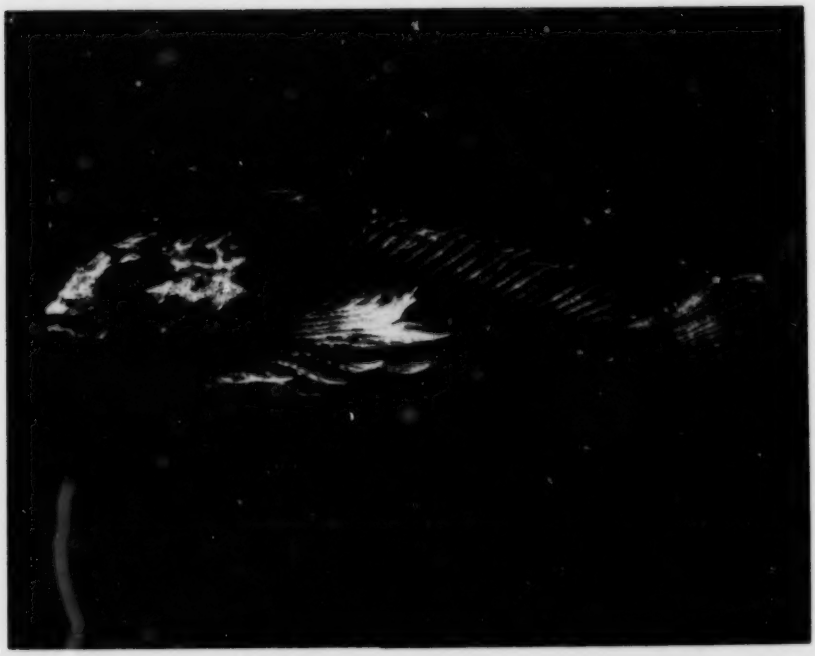

FIGURE 1.
Photo of holotype (USNM-204495) of *Nautichthys robustus* sp. nov., 39.8 mm in standard length. The anal fin became depressed during preservation. (Photo by T. A. Willock.)

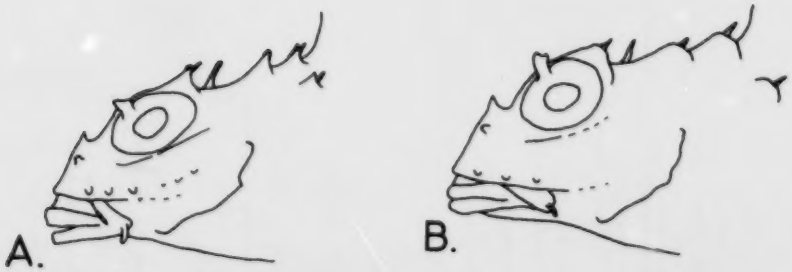

FIGURE 2.
Comparison of head spines: A. *Nautichthys robustus* sp. nov.; B. *Nautichthys pribilovius*